

REMARKS

The Examiner objected to Claim 5 due to an inadvertent spelling error. Claim 5 has been amended to correct the error. Entry of the Amendment is requested.

No new matter has been added.

Summary of Applicant's Invention

Applicant's invention relates to abrasive disks for use with orbital sanders which are designed for use with integral vacuum exhaust systems. Orbital sanders can generate a large amount of dust, particularly when used on wood, polymer composites, unmodified plastics, or painted surfaces. Many manufacturers sell orbital sanders with integral or readily attachable vacuum exhaust systems designed to suck away the dust as it is formed. A vacuum is applied to the back of a support pad to which the disk is attached, and the vacuum evacuates dust through holes provided in the disc and pad. However, there is a problem in that the pattern of exhaust holes in the pads is not standardized, so an abrasive disc intended for use with one particular model of sander will not fit a model from another manufacturer. For example, some models have five exhaust holes in the pad, while others have eight.

One prior art attempt to address this problem used discs having a multitude of perforations across the disc's surface. This approach sacrifices a good deal of effective grinding surface and requires a backing with sufficient porosity to allow passage of swarf without becoming prematurely clogged. A second approach used a disc with eight enlarged holes. The enlarged holes are sufficiently large enough so that they can be aligned with the holes of either a five- or eight-hole sander. However, this second approach requires a user to align the disc on the pad, and it has been found that users wish to change a disc without having to look at the how the disc is orientated on the pad.

Applicant's invention addresses these problems by providing a circular abrasive disc having a major abrading surface that includes perforations located exclusively within an annular zone. The perforations are essentially uniformly spaced within the zone such that the distance between any pair of adjacent perforations is less than twice the greatest dimension of either perforation. At least two perforations are in register with each exhaust port on an orbital sander. The annular zone is located where the exhaust ports are situated on a typical orbital sander with a vacuum device. As such, the perforations can cooperate with the vacuum device in order to remove swarf from a surface of a workpiece. Furthermore, there is no need to orient Applicant's

discs in any specific manner because the distribution and size of the perforations ensure that at least two are in register, and several others are in close proximity, with each exhaust port.

Rejection of Claims 1-5, 7, and 8 under 35 U.S.C. § 103(a)

The Examiner rejected Claims 1-5, 7, and 8 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,810,650, issued to Jöst, in view of U.S. Patent 4,184,291, issued to Marton. Claim 6 was rejected as being unpatentable over Jöst in view of U.S. Patent 5,309,682, issued to Gutknecht, et al.

In the February 24th Office Action, the Examiner stated that Jöst disclosed an abrasive disk for use with a suction-type apertured backup pad comprising a plurality of uniformly spaced perforations, at least some of which overlie the apertures in the pad to allow the disk to be placed randomly on the pad while still allowing suction passageways to remain open to draw dust through the pad. The Examiner also stated that the distribution of the perforations across the disk taught by Jöst does not appear to be critical and only perforations that lie within the annular region bounded by the pad apertures would be capable of delivering dust through the apertures, thus any holes located outside of this annular region are non-functional with respect to suction capability, and thus the particular range of holes would have been an obvious matter of design choice to those of ordinary skill in the art.

The Examiner cited Marton as teaching an abrasive disk for use with a sanding device, the sanding device comprising an array of apertures formed by a screen or a grid. The Examiner states that the array of apertures are intended to underlie exhaust ports of a pad and allow suction to draw dust and debris from the surface being sanded. The Examiner contends that it is clear from the drawings that the apertures are considerably smaller in size than the exhaust ports to the extent that at least two apertures in the screen would be in register with each exhaust port. The Examiner believes that, in view of these teachings of Marton, it would have been obvious to provide a hole spacing in the tool of Jöst such that at least two apertures are in register with each respective exhaust port to ensure adequate suction.

The Examiner further cited Gutknecht, et al. as teaching the alternative use of hook-and-loop or adhesive fastening of an abrasive disk to a backup pad. The Examiner believes that it would have been obvious to combine the teachings of Gutknecht, et al. with Jöst and Marton to use conventional hook-and-loop type or adhesive fastening means for temporary removal or repositioning of the disk on a backup pad.

The Applicant respectfully disagrees with the Examiner and notes that there are at least seven characteristics of Applicant's claimed invention which Jöst and Marton, either separately or in combination, do not teach or suggest, including:

1. an annular zone,
2. an annular zone that is a radial distance from the center of the disk from of one-third to one-half of the radius of the disk,
3. an annular zone that is a radial distance from the circumference of the disk from one quarter to one third the radius of the disk,
4. perforations exclusively within an annular zone, each having a diameter less than one quarter the width of the annular zone,
5. perforations that are essentially uniformly spaced in an annular zone,
6. perforations in an annular zone with a distance between any pair of adjacent perforations is less than twice the greatest dimension of either perforation, and
7. at least two perforations of an annular zone in register with each exhaust port on an orbital sander.

The Examiner dismisses the first three characteristics by stating that the distribution of the perforations across the disks taught by Jöst does not appear to be critical because only perforations lying within the annular region would be capable of delivering dust through apertures of a pad. The Examiner believes that any holes located outside of the annular region are non-functional with respect to suction capability. The Examiner relies on *In re Nelson*, 95 U.S.P.Q. 82 (C.C.P.A. 1952) for the proposition that the removal of a structure with a consequent loss of that structure's function is considered an obvious matter of design choice. The Examiner contends that the removal of non-functional suction apertures lying outside of an area encompassed by the suction passageways would have been no more than an obvious matter of design choice. The Examiner further contends that such modification would not destroy the utility of the device and would require less effort in the manufacture of the disk. The Examiner cites the combination of Marton and Jöst as suggesting the last four characteristics.

The Applicant disagrees and respectfully submits that the proposition from *Nelson* (i.e., the removal of structure with a consequent loss of it's function is considered an obvious matter of design choice) is not applicable to the present matter, as the elimination of the apertures of Jöst is not a "removal," as characterized by Examiner, but rather a *replacement*. In order to modify the teachings of Jöst in the way suggested by the Examiner, previously non-abrasive apertures must

be replaced with additional abrasive surface area, thereby providing additional functionality (i.e., additional abrading). As the Examiner's proposed modification would result in the disc having new structures with additional functions, the proposition in *Nelson* is inapplicable to the present matter.

The Applicant further submits that the Examiner has not established a prima facie case of obviousness. To establish a prima facie case of obviousness, the Examiner must show some suggestion or motivation to modify the references or to combine their teachings. The suggestion or motivation must be found within the prior art and may not be based upon applicant's disclosure. Furthermore, the prior art references must teach or suggest all the claim limitations.

The Examiner has not provided any suggestion or motivation to modify the teachings of Jöst to produce a disc having perforations solely in an annular zone. The Examiner stated that removing non-functional suction apertures would result in a decrease in the amount of effort needed in manufacturing the discs. However, that is not necessarily true and the Examiner offers no reasoning or proof that such a modification would result in such a decrease. In some respects, producing apertures only within a defined region can take more effort than producing discs having apertures over the entire surface of the disc. For example, confining apertures to a annular region on a disc can necessitate a more advanced stamping pattern and/or the disc may have to be aligned in a more sophisticated manner than if the apertures were simply produced over the entire surface of the disc. Also, such a manufacturing process can require more expensive machinery and/or result in a higher percentage of discs being rejected due to manufacturing irregularities. Hence, one skilled in the art would not be motivated to eliminate some of the apertures of the discs taught in Jöst in order to reduce the amount of manufacturing effort required. In fact, the additional effort needed to produce such discs would teach away from modifying the teachings of Jöst in the way proposed by the Examiner.

Also, the Examiner has not provided any suggestion or motivation to combine the teachings of Jöst and Marton to produce a disc having perforations exclusively within an annular zone. Furthermore, even if there were a motivation to combined the teachings of Jöst and Marton, that combination would teach away from a disc having perforations exclusively within an annular zone. As shown in Figure 1 of Marton, the exhaust ports of the sanders taught in Marton are not located in an annular zone, but are situated at various locations across the entire surface of the pad. One skilled in the art would not be motivated to replace some of the perforations on the discs taught in Jöst with additional abrading surface so as to form a disc

having perforations within an annular zone, yet alone an annular zone that is confined to the particular dimensions recited in Applicant's claimed invention. Indeed, one skilled in the art would be taught away from such a replacement as it would reduce the suction from a portion of the exhaust ports on the pads taught in Marton.

In view of these comments, Applicant respectfully asserts that the claimed invention meets the requirements of 35 U.S.C. § 103.

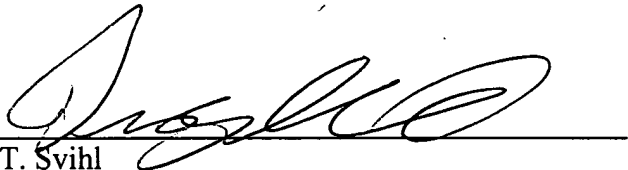
CONCLUSION

Claim 5 has been amended. In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner believes that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

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